Satellite Laser Ranging Concept Review

Operations Strategy
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Concept for Replacement SLR Network

- **New Network will function very similarly to existing one, except new stations will operate autonomously.**
- **Globally distributed network of ~8 to 12 stations.**
- **Each located near facility with existing infrastructure –**

  many at existing SLR sites.
- **Connected via internet with each other and to Central Facility (also phone connection for emergencies).**
- **Central Facility will operate semi-autonomously to:**
  - monitor performance of stations,
  - maintain spares,
  - schedule routine maintenance, repairs & upgrades,
  - respond to emergencies at stations.

SLR Data Products

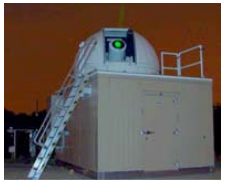
- **Full Rate (FR) Data**
  - Raw roundtrip time of flight data (ranges).
  - Each range is given with its associated fire time and other information (pointing angles, weather information).
  - Signal data – all returns determined to be noise are discarded.

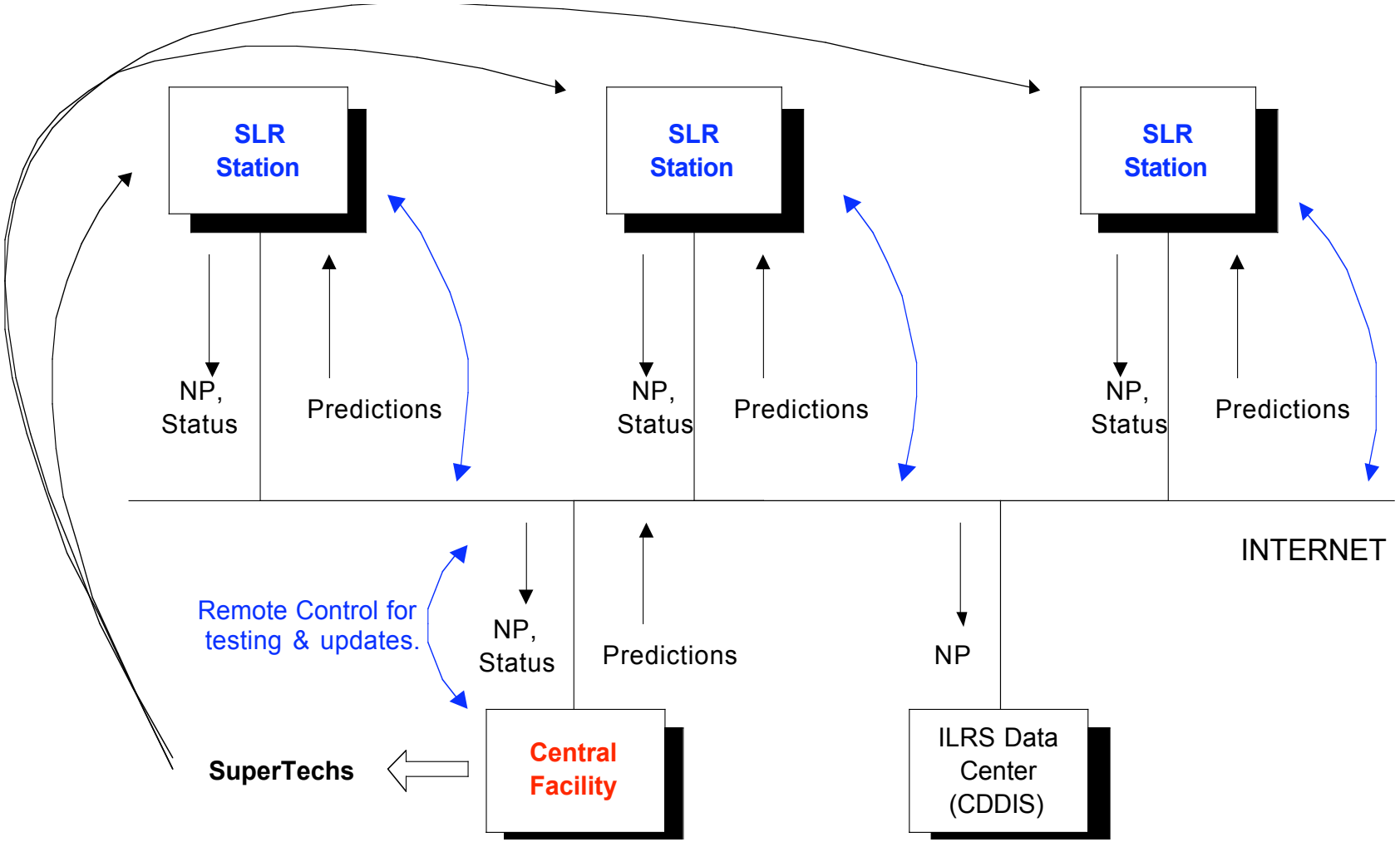
- **Normal Point (NP) Data**
  - Each NP contains a range which is representative of a period of time (seconds to minutes, dependent upon satellite).
  - NP is formed by fitting measured range data to orbit (predicted data). The mean of the orbital residuals is used to create the NP range.

Data Flow in New SLR Network

- **Predictions obtained from Central Facility in ILRS format.**
- **Ranging data in ILRS Normal Point format sent to Central Facility and ILRS Data Center (CDDIS) in semi-real-time.**
- **Full Rate data (ILRS format) available for transmission to the Central Facility for testing periodically.**
- **Tracking summaries and other system status information available via internet.**
- **Each station will:**
  - schedule itself based upon predictions and target priorities,
  - must be flexible and change in real-time for weather, clouds, other tracking, etc.

SLR Replacement Network – Block Diagram





Staffing for Network

- **SuperTechs: several**
  - run Central Facility,
  - repair & upgrade stations (requires travel).
- **Contract with local companies for routine maintenance of each station.**
- **Computer System Administrator on staff required for IT Security.**
- **Staff Analyst to provide assessment of Network performance & problems.**
- **Consultants to provide Engineering & Software expertise.**
- **Consultants for maintenance of prediction capability.**

Summary

- The Replacement SLR Network will function very similarly to the existing SLR Network, but with no operators in the field.
- All stations will operate autonomously and independently, but will be linked by the Central Facility.
- The Central Facility will maintain an overview of the entire Network for performance, maintenance, upgrade and repair.